PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
P2518PC00		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/FI2004/050159	11-11-2004	14-11-2003
International Patent Classification (IPC) or national classification and IPC		
See Supplemental Box		
Applicant		
Nokia Corporation et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 4 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
09-09-2005	25-01-2006
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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Cover sheet

INTERNATIONAL PATENT CLASSIFICATION (IPC):

H04N 7/14 (2006.01)
H04M 1/00 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2004/050159

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (Rules 12.3(a) and 23.1(b))
- ☐ publication of the international application (Rule 12.4(a))
- ☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1 - 18 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* 20 - 23 received by this Authority on 23-12-2005
pages* _____ received by this Authority on _____

☒ the drawings:

pages 1 - 4 as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing *(specify)*: _____
- ☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1 - 10	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1 - 10	NO
Industrial applicability (IA)	Claims	1 - 10	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

The invention is intended to improve an electronic device etc. having a rotatable camera fitted inside the case of the device.

Reference is made to the following documents:

D1: US 6532035 B1
D2: WO 0211439 A1
D3: EP 1187479 A2

Document D1 (column 2, line 25 - column 5, line 48, column 6, lines 59 - 67, figures 1 - 3, 6 - 7, abstract) shows an electronic device (mobile phone) which includes a case (12), a display (16), a camera (20) including an image sensor (72, figures 6 - 7) and a lens (32) fitted inside the case (12), and an aperture arrangement (38, 50) having three apertures in the case (12) for exposing the image sensor from the outside. The camera (20) including the image sensor (72) and the lens (32) is rotatable to three exposure directions (figures 1 - 3), including the directions to the display side (figure 2) and to the (opposite) rear side of the case (figure 3). A close-up lens (36) is arranged in the aperture arrangement (38, 50) at one aperture (recess 38). A motor (column 4, lines 38 - 41) can be used to rotate the camera (20). In the embodiments of figures 1 - 3, 6 - 7, no mirrors or reflectors are needed.

Document D2 (page 9, line 16 - page 10, line 8, figures 2 - 3, 7, abstract) shows a camera phone having a shutter device (lens cover 90) for closing an aperture (46, 48) in the case when it is not in use.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

Document D3 (paragraphs 0013 - 0036, figures 1 - 3C) shows an electronic device (mobile telephone) which includes a case (200), a display (230) and a camera body (100) that can rotate to two exposure directions (figures 3B, 3C), including the directions to the display side and to the rear side of the case. Detection means (210) determines the direction of the camera (100).

The device, method and image sensor according to amended claims 1, 3, 7, 9 and 10 differ from what is known from document D1, the closest prior art, essentially in that the image sensor and the optics arranged in connection with it can be (or are) linearly moved in the case structure, in order to permit their rotation.

The technical problem is how to permit rotation of the image sensor and the optics arranged in connection with it (or how to avoid collisions with the aperture arrangement) if the case is made smaller.

It would be obvious to a person skilled in the art who wants to reduce the size of the case of the device etc. according to document D1 to modify the device etc. in such a way that the image sensor and the optics arranged in connection with it (the camera 20) are moved linearly to avoid collision during the rotation with lenses fixed to apertures in the case. Consequently, the invention claimed in claims 1, 3, 7, 9 and 10 is novel but lacks an inventive step. Claims 1, 3, 7, 9 and 10 fulfil the requirement of industrial applicability.

The invention claimed in claims 2, 4 - 6 and 8 lacks an inventive step since the claims are directed to obvious construction details and no unexpected technical effect is obtained by adding these details to the device etc. of document D1 modified according to the above reasons, especially due to the following:

Claim 2 suggests that actuator devices are arranged to alter the focal length of a lens (zoom).

The technical problem is how to alternate the focal length.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

However, it is well known to provide a camera with a motor zoom lens.

Claims 4 - 5 and 8 suggest that shutter devices are provided for closing the aperture that is not in use.

The technical problem is how to prevent the exposure of the image sensor from the aperture that is not in use.

However, a solution to this problem is known in a similar camera from document D2 (page 9, line 16 - page 10, line 8, figures 2 - 3, 7, abstract).

Claim 6 suggests that in connection with the camera there are detection devices for determining the exposure directions (imaging path) in use at the time.

The technical problem is how to know the exposure directions (imaging path) in use at the time.

However, a solution to this problem is known in a similar camera from document D3 (paragraphs 0013 - 0036, figures 1 - 3C, abstract) that discloses detection means (210) for determining the direction of a camera (100).

Consequently, the invention claimed in claims 2, 4 - 6 and 8 is novel but lacks an inventive step. Claims 2, 4 - 6 and 8 fulfil the requirement of industrial applicability.

To sum up, the invention defined in claims 1 - 10 is novel but lacks an inventive step. All the claims fulfil the requirement of industrial applicability.

CLAIMS

1. An electronic device (10), which includes
   - a case structure (23),
   - a display component (19) fitted in connection with the case structure (23),
   - camera devices that can be oriented, fitted inside the case structure (23), including an image sensor (12) fitted entirely inside and optics (20.1, 20.2, 20.2'), and
   - an aperture arrangement including at least two apertures (21.1, 21.2) fitted in the case structure (23), for exposing the image sensor (12) directly from the outside, and

in which the image sensor (12) is arranged to be rotatable to at least two exposure directions (FS, BS), at least to the display-component (19) side (FS) and to an opposite side (BS) relative to the display component (19), according to which exposure directions (FS, BS) the aperture arrangement (21.1, 21.2) is arranged in the case structure (23) and at least part of the optics (20.2') is arranged to be rotatable along with the image sensor (12) and at least part of the optics (20.1, 20.2) is arranged in connection with the aperture arrangement (21.1, 21.2), characterized in that the image sensor (12) and the optics (20,2') arranged in connection with it can be linearly moved in the case structure (23), in order to permit their rotation.

2. A device (10) according to Claim 1, characterized in that at least part of the optics (20.1), is equipped with actuator devices (24), for example, in order to permit alteration of the focal length.

3. A device (10) according to Claim 1 or 2, characterized in that at least part of the optics, such as, for example, the

PCT / FI 2004 / 0 5 0 1 5 9
23 -12- 2005

optics (20.2, 20.2') arranged on the display-component (19) side, is arranged for close-up imaging.

4. A device (10) according to any of Claims 1 - 3, characterized in that in connection with the aperture arrangement (21.1, 21.2) there are shutter devices (22) for closing the aperture (21.1) that is not in use at the time.

5. A device (10) according to any of Claims 1 - 4, characterized in that the shutter devices (22) are in connection with the camera devices (12).

6. A device (10) according to any of Claims 1 - 5, characterized in that in connection with the camera devices (12) there are detection devices (16.5) for determining the exposure direction (FS, BS) in use at the time.

7. A method for controlling the orienting of camera devices (12) in an electronic device (10), in which there are directional camera devices inside the case structure (23) of the device (10), including at least an image sensor (12) and optics (20.1, 20.2, 20.2'), and in which the case structure (23) includes an aperture arrangement including at least two apertures (21.1, 21.2) in connection with at least part of the optics (20.1, 20.2) is arranged for exposing the image sensor (12) directly from the outside, which aperture arrangement (21.1, 21.2) is arranged in at least two exposure directions (FS, BS) at least to the display-component (19) side (FS) and to an opposite side (BS) relative to the display component (19), and in which method

- the image sensor (12) and at least part of the said optics (20.2') is oriented by rotating them to the selected exposure direction (FS, BS) without directing the orienting operations to the actual case structure (23) of the device (10) and

23-12-2005

- imaging is performed,

characterized in that, the image sensor (12) and the said part of the optics (20.2') are linearly moved in the case structure (23), in order to permit their rotation.

8. A method according to Claim 7, characterized in that the part of the aperture arrangement (21.1) not in use at the time is shut off from the aperture arrangement (21.1, 21.2).

9. A method according to Claim 7 or 8, characterized in that the rotation of the image sensor (12) and the optics (20.2') is motorized.

10. An image sensor (12), which can fitted to an electronic device (10), which electronic device (10) includes

- a case structure (23),
- a display component (19) arranged in connection with the case structure (19),
- camera devices that can be oriented, fitted inside the case structure (23), including the said entirely internally fitted image sensor (12) and optics (20.1, 20.2, 20.2'), and
- an aperture arrangement including at least two apertures (21.1, 21.2) fitted in the case structure (23) in connection with which aperture arrangement at least part of the optics (20.1, 20.2) is arranged, for exposing the image sensor (12) directly from the outside, and

in which the image sensor (12) is arranged to be rotatable to at least two exposure directions (FS, BS), at least to the display-component (19) side (FS) and to an opposite side (BS) relative to the display component (19), according to which exposure directions (FS, BS) the aperture arrangement (21.1, 21.2) is arranged in the case structure (23) and at least part of the optics (20.2') is arranged to be rotatable along with

the image sensor (12), characterized in that the image sensor (12) and the optics (20.2') arranged in connection with it can be linearly moved in the case structure (23), in order to permit their rotation.